NATURAL RESOURCES CONSERVATION SERVICE

CONSERVATION PRACTICE SPECIFICATION

BRUSH MANAGEMENT

(acre)
CODE 314

SCOPE

This document establishes the technical details, workmanship, and quality and extent of materials required to install the practice in accordance with the Conservation Practice Standard. The information shall be considered when preparing site-specific specifications for the practice.

The site-specific specifications for installing, operating, and maintaining the practice on a specific field or treatment unit shall be documented via the NRCS Hawaii Jobsheet for this practice and given to the client. Other documents such as practice worksheets, maps, drawings, and narrative statements in the conservation plan may be used to plan or design the practice and to prepare the site-specific specifications.

GENERAL

Operations to eliminate brush shall be carried out in dry weather whenever possible. The operation shall be completed before the seed of the target species matures.

Irregular-shaped strips or patches of brush may be left scattered over 10 to 20 percent of the area to enhance wildlife habitat or natural aesthetics. Refer to the standards and specifications for wildlife habitat management where preservation or enhancement of wildlife values are the planned objective.

When the treated area requires revegetation, the most applicable of the following listed standards and specifications will be followed:

- **Pasture and Hay Planting** (Code 512).
- **Critical Area Planting** (Code 342).
- **Recreation Area Improvement** (Code 562).
- **Range Planting** (Code 550).

Revegetation operations that are needed will be carried out as soon as possible after brush clearing has been completed. Replanting is done with seed and/or vegetative material. Complete the brush clearing operation as close to the start of the rainy season as possible. Consider leaving brush piles for wildlife use.

Grazing, after brush management is completed, will be done in accordance with standards and specifications for **Prescribed Grazing** (Code 528A).

Brush management shall not be utilized where loss of the woody plant cover would increase soil erosion, unless the area will be established in more erosion-retarding type of vegetation.

Where brush removal will create a temporary erosion hazard, clearing will be done in alternating strips across the predominant slope or brush will be windrowed across the slope prior to revegetation.

MECHANICAL TREATMENT METHODS

Bulldozer

A brush rake should be used in place of the standard dozer straight blade wherever feasible. This is an effective method to remove trees and heavy brush. Avoid unnecessary disturbance or removal of the topsoil. Bulldozing should not result in large amounts of soil mixed with brush.

Brush Disk

This method is recommended on low-growing brush where stones will not interfere with the disking operation. Large offset disks can effectively control light to moderate stands of sprouting brush. The disks should be set to cut brush roots just below the crown. Two passes are usually needed for brush control. Trash or brush is chopped up and incorporated with the soil.

Rolling Chopper

This method is recommended for use on brush species with stem or trunk diameters of up to 5 inches. The crushing and chopping effectively controls non-sprouting brush, small trees or slash.

Rotary Brush Mower

This method should be used on rock free areas with brush species and sprouts of up to 3 inches in diameter. Rotary cutters, shredders and rotobeaters cut brush near ground level and chop it into mulch. They are effective in controlling upright annuals and are useful for frequently repeated treatments of sprouting species.

Grubber

Grubbers remove individual trees or shrubs by cutting the roots below the soil surface and lifting the plants from the ground. They are effective in removing scattered stands of sprouting plants. Because this method is time consuming, it is not well suited for removing dense stands of brush.

Root Plow or Undercutter

This method is effective in killing all types of vegetation. Root plows or undercutters are blades (usually V-shaped) mounted between two shanks. The shanks are usually attached to a hydraulically operated toolbar. The blades are pulled laterally through the soil, cutting all roots at the desired depth. This method is not adapted to rocky soils.

BIOLOGICAL TREATMENT

Biological controls have been introduced for various brush species such as firetree, gorse, hamakua pamakani, lantana and panini cactus. Contact the Hawaii State Department of Agriculture, University of Hawaii and U.S. Forest Service regarding biological control of these and other species before attempting chemical control to avoid injuring beneficials.

CHEMICAL TREATMENT

When using herbicides, the recommendations of the University of Hawaii, College of Tropical Agriculture and Human Resources and other qualified agronomic specialists will be followed. Refer to Table 1 for herbicides registered for pasture/range use in Hawaii. Herbicides will be applied according to the directions on the product label. Consideration must be given to the potential of contaminating surface and ground water. Refer to the Pest Management Standard and the soil/pesticide interaction ratings.

Herbicide users should be cautioned as follows: If herbicides are handled or applied improperly, or if unused portions are not disposed of safely, they may injure humans, domestic animals, desirable plants, fish or other wildlife, and may contaminate water bodies, nearby crops or other vegetation. Follow the directions and heed all precautions on the container label. Landowners and applicators should be aware of and adhere to the provisions of state and federal laws and regulations concerning the use of agricultural chemicals.

Conformance with permits of all state and federal regulations for use of chemicals shall be the responsibility of the landuser. Permits for use of chemicals will specify legally required setbacks from watercourses, ponds, residences, etc.

APPLICATION METHODS

Foliar

This method is the most common for applying herbicides. Applications can be made using hand sprayers, power sprayers or aircraft. In addition, wipe-on systems and very- and ultra-low volume applicators are available.

Cut-surface (injection, notching, cut-stump, frilling)

The bark of brush and trees is mechanically penetrated and the herbicide placed directly into the sapwood (xylem). This is an effective method. Tree injectors are available that pierce the bark and deposit the herbicide. The bark may be notched with an ax or machete. Herbicide is then squirted into the wound. With the cut-stump method, herbicide is applied to the surface of the freshly cut stump that is at or near ground level. Frilling is where the trunk is girdled and herbicide applied to the wound-ring completely around the trunk.

Basal Bark

The trunk is wetted from the base to about 20 inches above the soil line with a mixture of an oil soluble herbicide and a light oil. The oil is used to penetrate the bark. The solution is either sprayed or brushed on the trunk. Complete coverage of the treated area is important as misses or skips could allow buds to sprout. This includes the base of the trunk to ensure that buds will not sprout from the root crown.

Soil Application

Granular or pelleted herbicides are applied by hand, with a mechanical spreader or by aircraft. The herbicide is taken up by the plant roots. This method is particularly suited for brush control in remote areas or areas with rough terrain where hauling of spraying equipment and water is difficult.

TABLE 1: HERBICIDES REGISTERED FOR PASTURE / RANGE USE IN HAWAII [1/]

Herbicide	Product	Application	Comments
Clopyralid	Transline	Foliar, Cut-Surface	Selective control of broadleaves. Especially effective on legumes, except gorse. Readily absorbed by foliage and roots. Readily translocates in plants. New herbicide. Unrestricted.
2, 4-D	Amine salts – Dacamine 4D, DMA4, Formula 40, Savage, Weedar 64; Esters-Clean Crop Low Vol 4, Esteron 6E	Foliar, Basal Bark (esters only), Cut-Surface	Selective control of broadleaves. Translocates in plant. Effective on guava, Not persistent in soils, Restricted, drift hazard.
Dicamba	Banvel	Foliar, Cut-Surface	Selective control of broadleaves. Translocates in plant. Effective on guava and christmasberry. Unrestricted.
Glyphosate	Roundup	Foliar, Cut-Surface	Non-Selective control of broadleaves and grasses. Spot spray for brush control, broadcast spray for pasture renovation. Waiawi, guava, christmasberry, koa haole and banyan are sensitive to cut-surface treatments. Lantana is very susceptible to foliar applications. Translocates readily in plants. Inactive in soil and not taken up by plant roots. Unrestricted.
Hexazinone	Velpar L	Soil	Nonselective. Absorbed by roots. Translocates in plant via xylem. Very soluble and sufficiently mobile in soil to have potential for groundwater contamination. Soil application is done with an exact delivery gun applicator to spots in soil around base of weeds within 3 feet of root crown. Unrestricted.
Metsulfuron	Escort	Foliar	Selective control of broadleaves and ginger. Somewhat effective on lantana and gorse. Translocates in plant. Readily absorbed by foliage and roots. Very low doses effective but care should be taken to avoid drift. Unrestricted.
Paraquat	Gramoxone, Ortho Paraquat CL	Foliar	Non-selective, contact herbicide. Not translocated in plant. Used primarily as a foliar spray for suppression of existing vegetation for pasture/range renovation. Rapidly absorbed by foliage. Inactive in soil. Restricted use. Special permit from Hawaii Department of Agriculture required.

TABLE 1: CONTINUED

Herbicide	Product	Application	Comments
Picloram	Tordon 22K	Foliar	Selective control of broadleaves. Effective for control of hila hila, christmasberry, gorse, lantana, black wattle, cactus, catsclaw, firetree and koa haole. Translocated in plant. Readily absorbed by foliage and roots. Persistent and mobile in soils. Very soluble and has potential for ground-water contamination. Restricted use. Special permit from Hawaii Department of Agriculture required. Spot spraying only. Hazard to non-target plants.
Tebuthiuron	Spike 20P	Soil	Somewhat selective control of woody plants (grasses require higher rates). Translocated in xylem. Persistent in soil but not very mobile. Controls koa haole, guava, waiawi, thimbleberry and christmasberry. Unrestricted.
Triclopyr	Redeem (amine salt), Remedy (ester), Crossbow (Triclopyr ester +2,4,D), Garlon 3A (amine salt), Garlon 4 (ester)	Foliar, Basal Bark (ester only), Cut-Surface	Selective control of broadleaves. Most grasses are tolerant. Effective on klu, fomosa koa, lantana, koa haole, melastroma, hila hila, waiawi, guava, gorse, blackberry and christmasberry. On guava, basal bark or cut-surface applications are very effective, foliar applications are moderately effective. On lantana, basal bark applications are effective, foliar applications result in poor control. On gorse, the amine salts are more effective than esters but require an effective surfactant such as Sylgard 309. On miconia, basal bark applications with Garlon 4 or Remedy are highly effective. Cut-surface, frill or girdle treatments with Garlon 3A are highly effective. Readily absorbed by foliage and roots. Translocates in plants. Mobile in soil. Unrestricted.

1/ Philip S. Motooka, Extension Specialist in Weed Science, University of Hawaii. Personal communication. 1997.

Reference to a company or product name does not imply approval or recommendation of the product by the USDA Natural Resources Conservation Service to the exclusion of others that